



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/536,618	03/28/2000	Toyokazu Fujii	43889-929	5999
20277	7590	11/05/2003	EXAMINER	
MCDERMOTT WILL & EMERY 600 13TH STREET, N.W. WASHINGTON, DC 20005-3096			PHAM, HOAI V	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/536,618	FUJII ET AL.	
	Examiner	Art Unit	
	Hoai V Pham	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(e). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,6,7,12,13 and 37-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,6,7,12,13 and 37-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/018,181.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 7 is objected to because of the following informalities:

Claim 7 has the same limitation as recited in claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 39-50 are rejected under 35 U.S.C. 102(b) as being anticipated by Sim et al. [U.S. Pat. 5,399,518] previously applied.

With respect to claim 39, Sim et al. (fig. 5, col. 6) discloses a semiconductor device comprising:

a substrate (10) having a semiconductor region;

an insulating film (22) formed on said semiconductor region and having a property of reflowing due to a heat treatment under predetermined conditions (see col. 6, lines 34-38);

a silicon oxide film (42) formed on said insulating film (see col. 6, lines 39-44);

a silicon nitride film (42) formed on said silicon oxide film (see col. 6, lines 39-44);

a contact hole formed through said silicon nitride film, said silicon oxide film and said insulating film (see fig. 5); and

a contact (50) formed in said contact hole, wherein the entire lower surface of said silicon oxide film is contacted with the upper surface of said insulating film (see fig. 5).

With respect to claim 40, Sim et al. discloses that the insulating film (22) includes impurities (see col. 6, lines 35-38).

With respect to claim 41, Sim et al. discloses that the insulating film (22) includes phosphorus (see col. 6, lines 35-38).

With respect to claim 42, Sim et al. discloses that the insulating film (22) includes boron (see col. 6, lines 35-38).

With respect to claim 43, Sim et al. discloses that the insulating film (22) includes boron and phosphorus (see col. 6, lines 35-38).

With respect to claims 44-46, Sim et al. discloses that the insulating film (22) is planarized (see fig. 5 and col. 6, line 39).

With respect to claims 47-50, Sim et al. discloses that the entire lower surface of said silicon nitride film is contacted with the upper surface of said silicon oxide film (col. 6, lines 39-44).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 4, 6, 7, 12, 13, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. [U.S. Pat. 5,652,165] previously applied, in view of Lee [U.S. Pat. 5,936,272] previously applied.

With respect to claim 1 and 6, Lu et al. (figures 1-11, cols. 3-6) discloses a semiconductor device comprising:

a substrate (10) having a semiconductor region;

a first insulating film (30A) formed on the semiconductor region (col. 4, lines 50-57);

a second insulating film (50) formed on the first insulating film and containing at least silicon nitride (col. 6, lines 24-32); and

a supporting film (32A) formed between the first and second insulating films (col. 4, lines 57-60), wherein the entire lower surface of the supporting film contacts the upper surface of the first insulating film (fig. 1).

Lu et al. fails to disclose a silicon nitride film formed between the supporting film and the second insulating film. However, Lee discloses that the silicon nitride (136) is overlying the supporting film (135) and underlying the storage node (160) (fig. 4G, col. 8, lines 52-53). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to form the etching stopper film overlying the supporting film, as taught by Lee, into the device of Lu et al. so as to use it as an etch stop layer.

With respect to claim 4, Lu et al. discloses that the semiconductor device is a stacked DRAM cell comprising:

- an interlayer insulating film (30A) formed on the semiconductor region;

- a storage node (34) filling an opening formed in the interlayer insulating film and extending over apart of the interlayer insulating film (fig. 11);

- a capacitor insulating film (50) and a plate electrode (54) formed for coverage over the storage node (fig. 11), wherein

 - the first insulating film defining the interlayer insulating film,

 - the second insulating film defining the capacitor insulating film,

 - the supporting film is interposed between the interlayer insulating film and the capacitor insulating film.

With respect to claim 7, Lu et al. discloses that the second insulating film (50) comprises a silicon nitride film (col. 6, lines 24-32).

With respect to claim 12, Lu et al. discloses that the first insulating film (30A) comprises a BPSG film (col. 4, lines 50-57).

With respect to claim 13, Lu et al. discloses that the supporting film (32A) comprises a silicon oxide film (col. 4, lines 57-60).

With respect to claim 37, Lu et al. discloses that the supporting film (32A) does not reflow due to the heat treatment which causes the first insulating film (30A) to reflow.

With respect to claim 38, Lu et al. discloses that the second insulating film (50) is formed directly on the surface of the supporting film (32A) (fig. 11).

Response to Arguments

7. Applicant's arguments with respect to claims 1, 4, 6-7, 12-13, 37-38, and 39-50 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

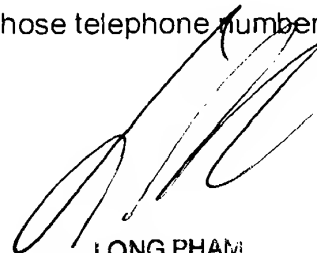
8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

9. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoai V Pham whose telephone number is 703-308-6173. The examiner can normally be reached on 7:30A.M. - 6:00P.M..

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 703-308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

12. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



LONG PHAM
PRIMARY EXAMINER

HP
Hoai Pham
October 31, 2003